U.S. Department of Energy
Office of River Protection
P.O. Box 450, MSIN H6-60
Richland, Washington 99352

0070703

AUG 2 5 2006

06-ESQ-124

Mr. A. W. Conklin, Head
Air Emissions and Defense
Waste Section
Washington State
Department of Health
P.O. Box 47827
Olympia, Washington 98504

Dear Mr. Conklin:

RADIOACTIVE AIR EMISSIONS NOTICE OF CONSTRUCTION (NOC) APPLICATION FOR REMOVAL OF LIQUID FROM CATCH TANK 241-ER-311

Attached for the Washington State Department of Health's review and approval is the radioactive air emissions NOC application for removal of liquid from Catch Tank 241-ER-311.

This NOC is being submitted in accordance with "Washington Administrative Code," 246-247, "Radiation Protection Air Emissions," and Title 40, "Code of Federal Regulations," Part 61, "National Emission Standards for Hazardous Air Pollutants."

If you have any questions, please contact me, or your staff may contact Dennis W. Bowser, Office of Environmental Safety and Quality, (509) 373-2566.

Sincerely,

Roy J. Schepens, Manager
Office of River Protection

ESQ:DWB

Attachment

cc: See page 2

cc w/attach:
O. S. Wang, Ecology
N. A. Homan, FHI
J. Martell, WDOH Richland Office
Administrative Record
BNI Correspondence
CH2M HILL Correspondence
Environmental Portal, LMSI

cc w/o attach:
B. G. Erlandson, BNI
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J. A. Bates, FHI
G. Bohnee, NPT
K. Niles, Oregon Energy
M. F. Jarvis, RL
R. Jim, YN

Attachment
06-ESQ-124

Radioactive Air Emissions Notice of Construction Application for Removal of Liquid from Catch Tank 241-ER-311

RADIOACTIVE AIR EMISSIONS NOTICE OF CONSTRUCTION APPLICATION FOR REMOVAL OF LIQUID FROM CATCH TANK 241-ER-311

L. L. Penn
CH2M HILL Hanford Group, Inc.

Date Published
August 2006

CH2MHILL
Hanford Group, Inc.

Prepared for the U.S. Department of Energy
Office of River Protection

Contract No. DE-AC27-99RL14047

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APPENDICES

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INTRODUCTION

This document serves as a notice of construction (NOC) application, in accordance with 40 Code of Federal Regulations (CFR) 61.07 and Washington Administrative Code (WAC) 246-247-060, for the operation of an exhaust system on Catch Tank 241-ER-311 for the purpose of evaporating approximately 400 gallons of liquid remaining in the tank. A recent determination that this tank may have leaked has prompted a decision to remove the free liquid by means of evaporation or possibly pumping.

The total effective dose equivalent (TEDE) from all calendar year 2005 Hanford Site air emissions (point sources as well as diffuse and fugitive sources) was 0.039 millirem (DOE/RL-2002-20). The emissions resulting from the activities covered by this NOC application, in conjunction with other operations on the Hanford Site, will not exceed the National Emission Standard of 10 millirem per year (40 CFR 61, Subpart H). The potential unabated emissions from removal of the liquid in 241-ER-311are estimated to result in a TEDE to the hypothetical offsite maximally exposed individual of approximately 1.47E-03 millirem per year. Abated emissions are estimated to result in a TEDE to the hypothetical offsite maximally exposed individual of 1.47E-05 millirem per year. Activities that contribute to this dose include pit entries, equipment installation and removal, and active and passive ventilation. This dose estimate is conservative for purposes of bounding project activities. The duration of project activities is expected to be two years and the anticipated start of construction is September 2006.

This application also provides notification of anticipated initial start-up, in accordance with 40 CFR 61.09(a)(1). It is requested that approval of this application will also constitute Environmental Protection Agency (EPA) acceptance of the initial start-up notification. Written notification of the actual date of initial start-up, in accordance with 40 CFR 61.09(a) (2) will be provided at a later date.

TERMS

ALARACT	as low as reasonably achievable control technology
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
CFR	Code of Federal Regulations
EPA	U.S. Environmental Protection Agency
HEPA	high-efficiency particulate air
MEI	maximally exposed individual
MPR	maximum public receptor
NOC	notice of construction
RPP	River Protection Project
SEPA	State Environmental Policy Act
SST	single-shell tank
TEDE	total estimated dose equivalent
TWINS	tank waste inventory network system
WAC	*Washington Administrative Code*
WDOH	Washington State Department of Health

METRIC CONVERSION CHART

Into metric units			Out of metric units		
If you know	Multiply by	To get	If you know	Multiply by	To get
Length			**Length**		
Inches	25.40	Millimeters	millimeters	0.0393	Inches
Inches	2.54	Centimeters	centimeters	0.393	Inches
Feet	0.3048	Meters	meters	3.2808	Feet
Yards	0.914	Meters	meters	1.09	Yards
Miles	1.609	Kilometers	kilometers	0.62	Miles
Area			**Area**		
square inches	6.4516	Square centimeters	square centimeters	0.155	Square inches
square feet	0.092	square meters	square meters	10.7639	Square feet
square yards	0.836	square meters	square meters	1.20	Square yards
square miles	2.59	Square kilometers	square kilometers	0.39	Square miles
Acres	0.404	Hectares	hectares	2.471	Acres
Mass (weight)			**Mass (weight)**		
Ounces	28.35	Grams	grams	0.0352	ounces
Pounds	0.453	Kilograms	kilograms	2.2046	pounds
short ton	0.907	metric ton	metric ton	1.10	short ton
Volume			**Volume**		
fluid ounces	29.57	Milliliters	milliliters	0.03	fluid ounces
Quarts	0.95	Liters	liters	1.057	Quarts
Gallons	3.79	Liters	liters	0.26	gallons
cubic feet	0.03	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.76456	cubic meters	cubic meters	1.308	cubic yards
Temperature			**Temperature**		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit
Force/Pressure			**Force/Pressure**		
pounds per square inch	6.895	Kilopascals	kilopascals	1.4504×10^{-1}	pounds per square inch

Source: *Engineering Unit Conversions*, M. R. Lindeburg, PE, Second Ed., 1990, Professional Publications, Inc., Belmont, California.

Radioactive Air Emissions Notice of Construction Application for Removal of Liquid from Catch Tank 241-ER-311

1.0 FACILITY NAME AND LOCATION

Name and address of the facility and location, (latitude and longitude) of the emission unit(s).

The 241-ER-311 Catch Tank is located in the 200 East Area on the Hanford Site. The Geodetic coordinates are:

Latitude 46° 33' 19"
Longitude 119° 32' 42"

2.0 RESPONSIBLE MANAGER

Name, title, address, and phone number of the responsible manager.

Roy J. Schepens, Manager
U.S. Department of Energy, Office of River Protection
P.O. Box 550
Richland, Washington 99352
(509) 376-6677

3.0 PROPOSED ACTION

Identify the type of proposed action for which this application is submitted: (a) Construction of new emission unit(s); (b) Modification of existing emission unit(s); identify whether this is a significant modification – significant means the potential-to-emit airborne radioactivity at a rate that could increase the TEDE to the MEI by at least 1.0 mrem/yr as a result of the proposed modification; (c) Modification of existing unit(s), unregistered.

This application is submitted in accordance with WAC 246-247-060(1) (a) for the modification of an existing registered emission unit.

The proposed action will be the operation of a 500 cfm portable exhauster connected to a riser, and in conjunction with an inlet HEPA filter, to remove evaporate liquid in the 241-ER-311 Catch Tank. A small volume of the liquid may be pumped out during this activity. Design enhancements may include the insertion of a sleeve inside the existing risers to direct air flow closer to the liquid surface.

The increase in the TEDE to the MEI as a result of this modification is not significant as defined by WAC 246-247-030(25)."

4.0 SEPA

If this project is subject to the requirements of the State Environmental Policy Act (SEPA) contained in chapter 197-11 WAC, provide the name of the lead agency, lead agency contact person, and their phone number.

The proposed activities are categorically exempt from the State Environmental Policy Act (SEPA) requirements in accordance with WAC 197-11-845.

5. 0 CHEMICAL AND PHYSICAL PROCESSES

Describe the chemical and physical processes upstream of the emission unit(s).

The 241-ER-311 catch tank consists of a horizontal cylindrical vessel made of stainless steel 9 feet in diameter and 36 feet long, with a pump pit above the tank. The tank has a maximum capacity of 17,684 gallons. Approximately 400 gallons of free liquid remain in the tank.

The primary function of this tank was to serve as a drain to diversion boxes 241-ER-151 and 241-ER-152 diversion boxes. Since 1980, the primary fluids received by ER-311 were rain water/snowmelt, line flushes, pressure test water and some leakage from 244-BX to AW-105 transfer and from the 241-ER-151 diversion box. Chemical analysis of samples taken in 1998 and 1999 indicate that the liquid is greater than 99 wt% water. The tank was last pumped out in April of 2005. These catch tanks and diversion boxes have since had weather covers placed on them to reduce intrusion. 241-ER-311 was taken out of service as part of the Hanford Federal Facility Agreement and Consent Order, and a weather cover was installed in June of 2005.

The remaining liquid will be largely undisturbed except for the evaporative flow of air across its surface and possibly pumping of a small volume. Breather filters and inlet riser extensions will be installed and removed as necessary to accommodate the process of evaporation.

6.0 EXISTING AND PROPOSED ABATEMENT TECHNOLOGY

Describe the existing and proposed (as applicable) abatement technology. Describe the basis for the use of the proposed system. Include expected efficiency of each control device, and the annual average volumetric flow rate(s) in meters^3/sec for the emission unit(s).

During riser preparation, controls will be established using as low as reasonably achievable control technology (ALARACT) 1 "Demonstration for riser preparation/opening," ALARACT 4 "Demonstration for packaging and transportation of waste," ALARACT 6 "Demonstration for pit access," ALARACT 13 "Demonstration for installation, operation, and removal of tank equipment," ALARACT 14 "Demonstration for pit work," ALARACT 15 Demonstration for size reduction of waste equipment for disposal," and ALARACT 16 "Demonstration for work on potentially contaminated ventilation system components."

A portable, 500 cfm (0.23 m^3/sec) ventilation system such as POR-06 (296-P-45) or equivalent will be installed on a riser on the 241-ER-311 Catch Tank. The portable exhauster consists of a skid mounted air clean-up train, which includes two stages of HEPA filters as the primary exhaust air abatement technology. The system is designed to pass outside air through the tank and then filter that air during exhauster operations before exiting to the atmosphere. The abatement technology for this system includes a heater, a pre-filter, two HEPA filters in series, a fan, and a 17 foot high, 10-inch diameter stack positioned on up to 4 feet of dunnage. During Exhauster operations, air from the tank will be heated before passing through the pre-filter and two HEPA filters to ensure that condensation of air stream moisture is minimized through this section. Drains in each of the filter and heater housings allow any condensed liquid to flow away from the components and to be collected in a seal pot for removal.

A 500 cfm inlet HEPA filter in an ASME AG-1 compliant housing will be installed on a second riser on the 241-ER-311 to accommodate the inlet air stream created by the use of the portable exhauster. When the exhauster is not running, the inlet HEPA filter will serve as a tank barometric breather filter to provide abatement of particulate emission from the tank.

The HEPA filters will be nuclear grade disposable extend-media dry-type in a rigid frame having minimum particle collection efficiency of 99.97 percent for 0.3-micrometer median diameter, thermally generated dioctyphthalate particles or other specified challenge aerosols. Pressure drop of a clean filter will be a maximum of one-inch water gauge at rated flow. The frame will be corrosion resistant for the air stream design conditions.

The HEPA filter housings on both the tank air inlet and the exhaust skid will provide sealed barriers for the confinement of airborne radionuclides and will serve to encapsulate and hold the HEPA filter in place with a positive seal on its mounting frame. The filter housings will provide for the attachment of pressure differential measurement components. Each filter housing will meet the applicable sections of ASME N509 and ASME AG-1 and the test requirements of ASME N510. The filter housings will be leak tested using the pressure decay method in accordance with ASME N510. Leakage will not exceed 0.3 percent of the housing volume per hour.

The exhaust filter test sections will provide a means for in place testing of the HEPA filters tested to 99.95 percent efficiency. The inlet filter housing also provides for compliant HEPA filter efficiency testing. For the exhauster, one test section is placed downstream of the pre-filter section and upstream of the first HEPA filter section. The second test section is placed between the first stage HEPA filter housing and the second stage HEPA filter housing.

Ductwork will be used to connect the exhauster inlet to the tank riser. Precautionary measures to protect the air pathway during connection of the ductwork to the tank riser will take into account abrasion, leakage, tear strength, tensile strength, air stream temperature, outdoor exposure conditions and include the use of an isolation valve on the exhauster to minimize the time tank contents are exposed to the air. Ductwork will essentially be fabricated in conformance with ASME B31.3, *Process Piping*, and it will meet the requirements of ASME AG-1, section SA, with the exception of applicable exemptions technically justified in RPP-1923, *General WAC 240-247 Technology Standards Exemption Justification For Waste Tank Ventilation Systems.*

The exhaust fan will be constructed of non-sparking materials and will meet Air Movement Contractors Association (AMCA) Standard 99-0401-86 and be Type A construction. The fan will be a centrifugal type and be statically and dynamically balanced as an assembly. The exhaust stack will house the air velocity probe and the air-sampling probe.

The portable exhauster will be operated in accordance with the pre-operational testing per WAC 246-247-060 paragraph 4, and the notice of anticipated startup date provided in accordance with 40 CFR 62.09.

7.0 CONTROL TECHNOLOGY DRAWINGS

Provide conceptual drawings showing all applicable control technology components from the point of entry of radionuclides into the vapor space to release to the environment.

Figure 1. Typical Breather Filter Configuration.

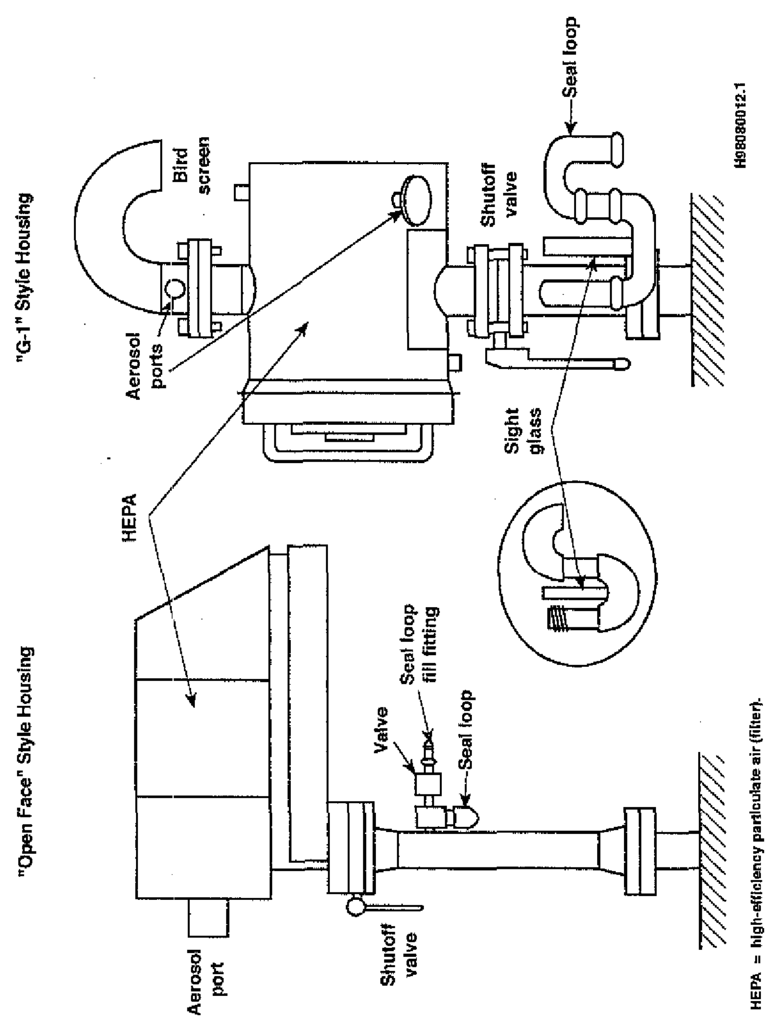
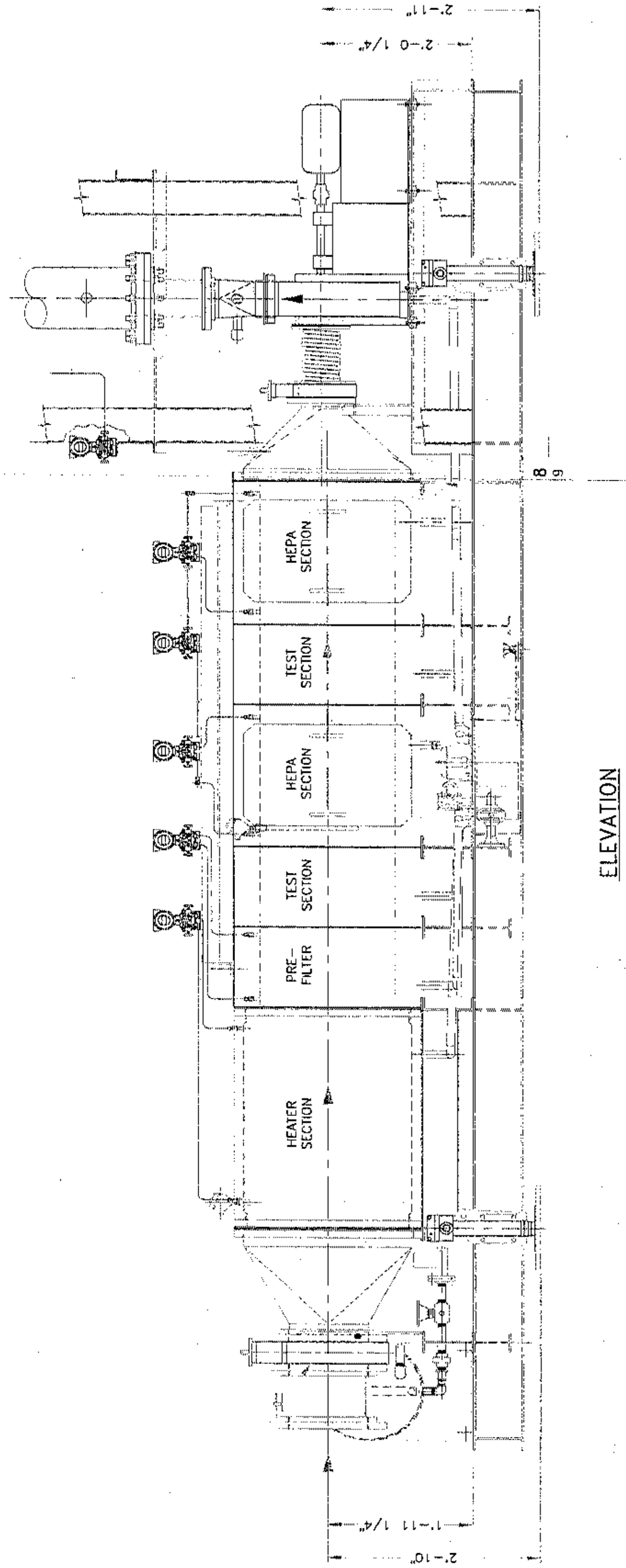


Figure 2. Typical Ventilation System.



8.0 RADIONUCLIDES OF CONCERN

Identify each radionuclide that could contribute greater than ten percent of the potential –to-emit TEDE to the MEI, or greater than 0.1 mrem/yr potential-to-emit TEDE to the MEI.

Cs-137 is the only radionuclide estimated to contribute greater than ten percent of the potential to-emit Total Effective Dose Equivalent (TEDE) to the Maximum Exposed Individual (MEI) from operation of the portable ventilation system for purposes of liquid removal from 241-ER-311.

9.0 EFFLUENT MONITORING SYSTEM

Describe the effluent monitoring system for the proposed control system. Describe each piece of monitoring equipment and its monitoring capability, including detection limits, for each radionuclide that could contribute greater than ten percent of the potential-to-emit TEDE to the MEI, or greater than 0.1 mrem/yr potential-to-emit TEDE to the MEI, or greater than twenty-five percent of the TEDE to the MEI, after controls. Describe the method for monitoring or calculating those radionuclide emissions. Describe the method with detail sufficient to demonstrate compliance with the applicable requirements.

The ventilation system will sample and monitor the exhausted emissions continuously. The system will collect its sample via a shrouded probe. The shrouded probe assembly is installed in the 10 inch section of the stack. The shrouded probe installation location and the transport lines are designed to adhere to the applicable requirements of ANSI/HPS N13.1-1999.

As noted in Table 1, Cs-137 is the only contributor greater than ten percent of the potential-to-emit TEDE to the MEI. A four week sample per year will be collected in the record sample collection system and analyzed for Total Alpha, Total Beta, and Cs-137 in the laboratory. Results will be published in the annual Hanford Site Emission reports. The quality and detection limits of these analyses are controlled via the current revisions of the following documents:

- HNF-EP-0528, *NESHAP Quality Assurance Project Plan for Radioactive Air Emissions*
- HNF-EP-0835-8, *Statement of Work for Services Provided by the Waste Sampling and Characterization Facility for the Environmental Compliance Program during Calendar Year 2006.*
- RPP-QAPP-004, *Quality Assurance Program Plan for Tank Farm Contractor Radioactive Air Emissions.*

Monitoring during installation of the ventilation system will be in accordance with, where applicable, ALARACT 16, Tank Farm ALARACT Demonstration for Work on Potentially Contamination Ventilation System Components.

10.0 ANNUAL POSSESSION QUANTITY

Indicate the annual possession quantity for each radionuclide.

The annual possession quantity for the 241-ER-311 Catch Tank is listed in the following table 1.0. The inventory data sources and volumes were taken from the Tank Waste Inventory Network Systems (TWINS), on 8/10/06. The samples documented in TWINS were liquid only, and were drawn and analyzed in 1999. The solids in the tank are pieces of equipment which have been abandoned in place and are, for the most part, submerged in the liquid. To be conservative, the known liquid volume was doubled to account for the solids.

Table 1. Annual Possession Quantity (APQ).

Radionuclide	Conc. µCi/mL	Conc. Ci/gal	APQ (Ci)	Total APQ Liquids and Solids (Ci)
Max liquid				
Am-241	1.71E-04	6.47E-07	2.39E-04	**4.79E-04**
Cs-137	3.34E+00	1.26E-02	4.68E+00	**9.36E+00**
Pu 239/240	1.20E-04	4.54E-07	1.68E-04	**3.36E-04**
Sr-89/90	1.03E+00	3.90E-03	1.44E+00	**2.88E+00**
Max solid				
Am-241	1.71E-04	6.47E-07	2.39E-04	
Cs-137	3.34E+00	1.26E-02	4.68E+00	
Pu 239/240	1.20E-04	4.54E-07	1.68E-04	
Sr-89/90	1.03E+00	3.90E-03	1.44E+00	
Total Max. Solids and Liquids:			**1.22E+01**	

11.0 PHYSICAL FORM

Indicate the physical form of each radionuclide in inventory: Solid, particulate solids, liquid, or gas.

Radionuclides in the tank are in the form of liquids and solids. Radionuclides in the pits are expected to be particulate.

12.0 RELEASE FORM

Indicate the release form of each radionuclide in inventory: Particulate solids, vapor, or gas. Give the chemical form and ICRP 30 solubility class, if known.

The radionuclides in the tank inventory listed in Table 1 all are assumed to be released as particulate. Radionuclides in the pits will be released as particulates.

13.0 RELEASE RATES

(a) New emission unit(s): Give predicted release rates without any emissions control equipment (the potential-to-emit) and with the proposed control equipment using the efficiencies described in subsection (6) of this section. (b) Modified emission unit(s): Give predicted release rates without any emissions control equipment (the potential-to-emit) and with the existing and proposed control equipment using the efficiencies described in subsection (6) of this section. Provide the latest year's emissions data or emissions estimates. In all cases, indicate whether the emission unit is operating in a batch or continuous mode.

The calculations for liquid removal from 241-ER-311 Catch Tank are based upon operating in a continuous mode.

The free liquid remaining in the tank will be largely undisturbed except for the evaporative flow of air across its surface and potential removing of liquid by pumping. The solids in the tank will remain untouched. The inlet filter replacement and exhauster connection will require riser openings of very brief durations. An assumption that the entire inventory contained in the tank will be exposed to the environment, would then provide a bounding and very conservative estimate of potential emissions from all activities, inclusive of pit entries and riser openings.

The release rate is derived by applying 40 CFR 61, Appendix D factors to the APQ listed in Table 1 of section 10.0. A release factor of 1.0E-06 has been applied to the solids in the tank, which are primarily equipment abandoned in place, and assumed to represent approximately half of the inventory. A release factor of 1.0E-03 is used for the liquid inventory.

The TEDE from all calendar year 2005 Hanford Site air emissions (point sources and diffuse and fugitive sources) was 0.039 mrem (DOE/RL-2006-01 Revision 0)

14.0 LOCATION OF THE MAXIMALLY EXPOSED INDIVIDUAL

Identify the MEI by distance and direction from the emission unit(s). The MEI is determined by considering distance, windrose data, presence of vegetable gardens, and meat or milk producing animals at unrestricted areas surrounding the emission unit.

The Maximum Exposed Individual (MEI) is determined using CAP-88 dispersion factors, which are derived for use on the Hanford Site and published in DOE/RL-2006-29, Revision 0, *Calculating Potential-to-Emit Radiological Releases and Doses.* Values used for the 241-ER-311 Catch Tank Ventilation system came from Table 4-10, for 200 W Area with effective release height < 40 meters. Table 4-10 gives values in two separate columns for an Offsite Maximum Public Receptor (MPR) and an Onsite MPR. Values from both columns were examined to determine the maximum dose. The results showed that the maximum dose occurred to the Onsite MPR. The results of this MEI determination are given in Appendix A. DOE/RL-2006-29, Table 4-2 states that the Onsite MPR for the 200 West area is 18,310 meters in the ESE direction. This location is at the Laser Interferometer Gravitational Wave Observatory (LIGO).

15.0 TOTAL EFFECTIVE DOSE EQUIVALENT TO THE MAXIMALLY EXPOSED INDIVIDUAL

Calculate the TEDE to the MEI using an approved procedure (see WAC 246-247-085). For each radionuclide identified in subsection (8) of this section, determine the TEDE to the MEI for existing and proposed emission controls, and without any emission controls (the potential-to-emit) using the release rates from subsection (13) of this section. Provide all input data used in the calculations.

The TEDE to the MEI resulted in emissions of approximately 1.47E-03 mrem/yr (unabated) and 1.47E-05 mrem/yr (abated), as shown in Appendix A. Although the system contains two HEPA filters in series, credit was taken for only one HEPA when calculating abated emissions. Derivations were performed in accordance with DOE/RL-2006-29, Revision 0, *Calculating Potential-to-Emit Radiological Releases and Doses.*

16.0 COST FACTOR IF NO ANALYSIS

Provide cost factors for construction, operation, and maintenance of the proposed control technology components and system, if a BARCT or ALARACT demonstration is not submitted with the NOC.

Pursuant to WAC 246-247-110, App. A (16), cost factors for construction, operation, and maintenance of proposed technology requirements are not required, as the Washington State Department of Health (WDOH) has provided guidance that HEPA filters are generally considered best available radionuclide control technology (BARCT) for particulate emissions, AIR-92-107. Because the key radionuclides of concern are particulates, it is proposed that the HEPA filter controls described in Section 6.0 be accepted as BARCT. Compliance with the substantive BARCT technology standards is described in Section 18.0

17.0 DURATION OR LIFETIME

Provide an estimate of the lifetime for the facility process with the emission rates provided in this application.

The duration of project activities is expected to be two years and the anticipated start of construction is September 2006.

18.0 STANDARDS

Indicate which of the following control technology standards have been considered and will be complied with in the design and operation of the emission unit(s) described in this application: ***ASME/ANSI AG-1****, Code on Nuclear Air and Gas Treatment (where there are conflicts in standards with the other listed references, this standard shall take precedence);* ***ASME/ANSI N509****, Nuclear Power Plant Air-Cleaning Units and Components;* ***ASME/ANSI N510****, Testing of Nuclear Air Treatment Systems; ASME/ANSI NQA-1. Quality Assurance Program Requirements for Nuclear Facilities;* ***40 CFR 60, Appendix A,*** *Methods 1, 1A, 2, 2A, 2C, 2D, 4, 5, and 17;* ***ANSI N13.1****, Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities. For each standard not so indicated, give reason(s) to support adequacy of the design and operation of the emission unit(s) as proposed.*

18.1 PASSIVE VENTILATION

The breather filter (passive ventilation system) has been designed to meet the required WAC-246-247-110 control technology standards as described in Table 2.0.

Table 2.0 Breather Filter Standards Comparison.

Standard	Does Design comply?	Notes
ASME/ANSI AG-1	Yes	Filters installed and G-1 housing design meet ASME AG--1.
ASME/ANSI N509	Yes	Filters installed and G-1 housing design meet ANSI N509.
ASME/ANSI N510	Yes	Filters are testable per ANSI N510.
ANSI/ASME NQA-1	Yes	Current version of QA program is RPP-MP-600.
ANSI N13.1	NA	Confirmatory measurements will consist of smears on the filter.
40 CFR 60, Appendix A Test Methods: 1, 1A, 2, 2A, 2C, 2D, 4	NA	ASME N510 filter testing requires air flow measurements. Other methods not required because flow rates vary based upon barometric breathing.
40 CFR 60, Appendix A Test Methods: 5, 17	NA	These methods are for sampling system designs. Periodic confirmatory measurements will be taken via smears in lieu of a sampling system.

18.2 PORTABLE EXHAUSTER

The exhauster (active ventilation system) has been designed to meet the standards as follows, with the exception of applicable exemptions technically justified in RPP-19233, *General WAC 246-247 Technology Standards Exemption Justification For Waste Tank Ventilation Systems*:

ASME AG-1

American Society for Engineers (ASME)/American National Standards Institute (ANSI) AG-1: This equipment specific code consists of five primary sections, which are applicable to this unit. The applicable sections are fans (Section BA), ductwork (Section SA), HEPA filter housing (Section HA), HEPA filters (Section FC), dampers (Section DA), heaters (Section CA) and Quality Assurance (QA) (Section AA).

The fan section of AG-1 (Section BA) covers the construction and testing requirements for fans. This fan meets the applicable criteria identified in AG-1, except as identified below. It was constructed to the Air Movement and Control Association (AMCA) 99-401, "Spark Resistant Construction," criteria, and was tested to the applicable sections of AMCA 210. However, it cannot be shown the shaft leakage criteria is met (Section BA 4142.2). This is acceptable because a shaft-packing box is installed around the shaft to minimize the leakage, and the leakage point is located after the HEPA filters.

The next applicable requirement is the ductwork section of AG-1 (Section SA). As was the case for the fan, this section identifies several requirements for ductwork. This includes acceptable material, fabrication, and testing criteria. The ductwork used will be a combination of both metal and flexible polymer. In both cases it does meet the applicable criteria and will be pressure tested per the applicable criteria identified in AG-1 and N510 prior to operation

The HEPA filter housing section (Section HA) was recently released and this section has taken the place of the requirements identified in N509. After reviewing the requirements identified in Section HA against the portable exhauster design, the portable exhauster filter housings are in compliance.

The HEPA filter section of AG-1 (Section FC) is also applicable in this instance. The filters, which will be installed in the exhauster, will meet the applicable sections of AG-1, except for two areas dealing with filter qualification testing. Justification for this exception was discussed with and approved by WDOH at the December 1998 Routine Technical Assistance Meeting and documented in WDOH letter AIR 99-507.

The dampers installed on the portable exhauster meet the applicable AG-1 criteria. This includes design, construction and testing. The manufacturer performed a leak test on the valves, and a pressure decay test was also completed on the exhaust train system. For the pressure decay test, the valves were used for isolation. The test was successful.

The heater installed in the portable exhauster meets the requirements of AG-1, Section CA. The heater relies on a glycol mixture that is heated by a separate heating unit, similar to a hot water tank. The heated glycol is then pumped through the heating coil located inside the exhaust system. This type of design allows the system to be used in a flammable gas environment. By using a glycol heater, there are no electrical, sparking or energized components in contact with the air stream. In addition, controls are in place to prevent the damage of the HEPA filters if the coil were to fail. This includes level detection in the glycol reservoir, which will detect the loss of glycol. Differential pressure across the first HEPA filter is monitored. If the coil were to break, the differential pressure across the first HEPA would increase and the system would be shutdown.

The quality assurance section of AG-1 relies on ASME NQA-1. The general QA criteria are located in Section AA. Specific component/system criteria are located in each section throughout AG-1. The portable exhauster was built on the Hanford Site and meets the site's QA program. This includes procurement of the safety material/components, along with appropriate pedigree from an evaluated supplier, tracking and maintaining the material/components after it arrived on site, inspection of the material/components, and witnessing the testing. Based on the above, the AG-1 criteria are met.

ASME N509

This standard deals with the individual components and how they relate to the overall system. The major sections of ASME/ANSI N509 have been replaced with those identified in AG-1. There are certain sections that are still applicable, such as Section 4.3, which discusses the maximum flow rate for the system not to exceed the lowest maximum rating of any component installed in the system. This is being met, along with the other applicable sections of N509.

ASME N510

This standard pertains to the testing of nuclear air cleaning systems. The first requirement identified in ASME/ANSI N510 is to perform a pressure decay test. This is to assure there are no infiltration or outward leak paths from the system. This test was completed on the portable exhauster and was successful.

This system meets the leak test criteria identified per N510. Test sections are located in the exhaust train to allow for proper independent testing of both HEPA filters.

Quality Assurance

The required technology standard is ANSI/ASME NQA-1, "Quality Assurance Program requirements for Nuclear Facilities." Quality Assurance for the ventilation system has been performed in accordance with HNF-IP-0842, *RPP Administration,* Volume XI, "Quality Assurance."

Stack Volumetric Flow Rate Determination Methods: Stack effluent flow rates are necessary to compile emissions and complete the required annual reports. Requirements for flow rates can be broken into three areas of discussion:

1. Measurements Location: The regulatory methods that specify the measurement location, distances from flow disturbances, number of measurements to take, etc. for stacks smaller than 12 inches in diameter are provided in the following method:

40 CFR 60, Appendix A, Methods 1A - Sample and Velocity Traverses for Stationary Sources with Small Stacks or Ducts.

Flow measurement locations and the number of measurements taken comply with these requirements.

2. Measurement Method: The regulatory citations that specify the measurement method and instrumentation to use are as follows:

   40 CFR 60, Appendix A, Methods 2 – Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube).

   40 CFR 60, Appendix A, Methods 2A – Direct Measurement of Gas Volume through Pipes and Small Ducts

   40 CFR 60, Appendix A, Methods 2C – Determination of Gas Velocity and Volumetric Flow Rate in Small Stacks or Ducts (Standard Pitot Tube). This method is applicable for the determination of average velocity and volumetric flow rate of gas streams in small stacks or ducts.

   40 CFR 60, Appendix A, Methods 2D – Measurement of Gas Volume Flow Rates in Small Pipes and Ducts.

Either Method 2 or Method 2C is used in Tank Farms. The primary difference between Method 2 and 2C lies in the fact that Method 2 is applicable for stacks larger than 12 inches in diameter, while 2C applies to stack smaller than 12 inches. Additionally, Method 2 primarily calls out for use of an S type pitot tube but does allow for a standard type pitot tube. Standard type pitot tubes are used throughout out Tank Farms.

3. Measurement Result: Flow rates are to be reported in dry standard units of temperature and pressure. This means that the moisture content of the air stream must be taken into account when finalizing the flow rate values. Method 2 and Method 2C (through reference to Method 2) call for the following method for this determination:

   40 CFR 60, Appendix A, Methods 4 – Determination of Moisture Content in Stack Gases. This method is applicable to determination of moisture content in stack gas. Method 2 requires that flow rates be converted to dry standard units.

   Instead of using Method 2, a humidity probe is used to determine moisture content of the stream. The humidity value determined from this instrument is mathematically incorporated into the final flow rate measurement.

In addition to the methods just discussed; 40 CFR 52, Appendix E – Performance Specifications and, Specification Test Procedures for Monitoring Systems for Effluent Stream Gas Volumetric Flow Rate – is also used. The methods discussed above are for manual measurements. The Appendix E method allows for the installation and operation of instrumentation to automatically and continuously take flow rate measurements. The Appendix E method requires use of Method 2 for use in comparison of the instrumentation readings and if after a series of measurements are taken the instrument accuracy is determined to be within that specified by the Appendix E method, the instrumentation is considered acceptable and can be used for flow rate determination and emission reporting purposes. In this manner, the system will meet Appendix E.

Sampling System Design Methods and Standards: Methods and Standards called out for sampling system design are as follows:

- 40 CFR 60, Appendix A, Methods 5 – Determination of Particulate Matter Emissions from Stationary Sources. This method is applicable for the determination of particulate emissions. This method details the sample probe, collection filter and holder, the vacuum system and instrumentation that might be used in the design of a particulate sample collection system.
- 40 CFR 60, Appendix A, Methods 17 – Determination of Particulate Matter Emissions from Stationary Sources. This method is applicable for determination of particulate matter (PM) emissions, where PM concentrations are known to be independent of temperature over the normal range of temperatures characteristic of emissions from a specified source category. It is intended for use only when specified by an applicable subpart of the standards, and only within the applicable temperature limits (if specified), or when otherwise approved by the Administrator. There are other provisions for use of this method. This method details the sample probe, collection filter and holder, the vacuum system and instrumentation that might be used in the design of a particulate sample collection system.
- ANSI N13.1-1969, Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities
- ANSI/HPS N13.1-1999, sampling and Monitoring Releases of Airborne Radioactive Substances from Stacks and Ducts of Nuclear Facilities:

No attempts have been made to design the sampling and monitoring system to Methods 5 and 17. Instead, the system has been designed to meet the intent of ANSI/HPS N13.1-1999. A shrouded probe assembly is installed. The installation location, as well as the shrouded probe assembly, to include transport lines, has been qualified per the applicable requirements of ANSI/HPS N13.1-1999. This is documented in PNNL-11701, *Generic Effluent Monitoring System Certification for Salt Well Portable Exhauster.*

19.0 REFERENCES

40 CFR 60, "Standards for Performance of New Stationary Sources," *Code of Federal Regulations,* as amended.

40 CFR 61, "National Emission Standards for Hazardous Air Pollutant." *Code of Federal Regulations,* as amended.

AMCA Standard 99-0401-86, Air Movement Contractors Association, Chicago, Illinois

ANSI/ASME AG-1, 1997, *Code on Nuclear Air and Gas Treatment,* American Society of Mechanical Engineers, New York, New York.

ANSI/ASME NQA-1, *Quality Assurance program Requirements for Nuclear Facilities*, American Society of Mechanical Engineers, New York, New York.

ANSI/HPS N13.1, 1999, *Sampling and Monitoring Releases of Airborne Radioactive Substances from Stacks and Ducts of Nuclear Facilities,* American National Standards Institute, New York, New York.

ANSI N13.1, 1969, *Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities*, American National Standards Institute, New York, New York.

ANSI N509, *Nuclear Power Plant Air Cleaning Units and Components*, American National Standards Institute, New York, New York.

ANSI N510, *Testing of Nuclear Air Treatment Systems*, American National Standards Institute, New York, New York.

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DOE/RL-2006-29, Revision 0, 2006, *Calculating Potential-to-Emit Release and Dose for FEMP and NOCs*. Fluor Hanford. Group Inc., Richland, Washington.

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HNF-EP-0182-174, *Waste Tank Summary Report for Month Ending, September 30, 2002,* CH2MHILL Hanford Group, Inc., Richland, Washington.

HNF-0528, Revision 5, *National Emission Standards for Hazardous Air Pollutants (NESHAP) Quality Assurance Project Plan for Radioactive Airborne Emissions,* Fluor Hanford Group, Inc., Richland Washington

Kriskovich, J. R., *Code and Standards Evaluation for POR-008 Portable Exhauster*, September 22, 2002, Vista Engineering Technologies, L.L.C.

RPP-10233, *General WAC 246-247 Technology Standards Exemption Justification For Waste Tank Ventilation Systems*, CH2M HILL Hanford Group, Inc., Richland, Washington.

RPP-MP-600, 2000, *QA Program Description for the Tank Farm Contractor,* CH2M HILL Hanford Group, Inc., Richland, Washington.

HNF-4327, Revision 1A, 2002, *Control of Airborne Radioactive Emissions for Frequently Performed TWRS Work Activities (ALARACT Demonstrations)*, CH2MHILL Hanford Group, Inc., Richland, Washington.

WAC 197-11-845, *State Environmental Policy Act,* "SEPA Rules, Department of Social and Health Services," *Washington Administration Code*, as amended.

WAC 246-247, "Radiation Protection – Air Emissions," *Washington Administrative Code,* as amended.

APPENDIX A

241-ER-311 TEDE to the MEI

Radionuclide	Conc. µCi/mL	Conc. Ci/gal	APQ	Release Fraction	CAP88-PC		Unabated TEDE to MEI		Abated TEDE to MEI		% Contrib.
Max liquid					off-site	on-site	off-site	on-site	off-site	on-site	
Am-241	1.71E-04	6.47E-07	2.39E-04	1.00E-03	9.80E+00	1.70E+01	2.35E-06	4.07E-06	2.35E-08	4.07E-08	0.28%
Cs-137	3.34E+00	1.26E-02	4.68E+00	1.00E-03	1.90E-01	3.10E-01	8.89E-04	1.45E-03	8.89E-06	1.45E-05	98.52%
Pu 239/240	1.20E-04	4.54E-07	1.68E-04	1.00E-03	6.40E+00	1.10E+01	1.08E-06	1.85E-06	1.08E-08	1.85E-08	0.13%
Sr-89/90	1.03E+00	3.90E-03	1.44E+00	1.00E-03	8.80E-02	1.10E-02	1.27E-04	1.59E-05	1.27E-06	1.59E-07	1.08%
							1.02E-03	**1.47E-03**	1.02E-05	**1.47E-05**	
Max solid											
Am-241	1.71E-04	6.47E-07	2.39E-04	1.00E-06	9.80E+00	1.70E+01	2.35E-09	4.07E-09	2.35E-11	4.07E-11	0.28%
Cs-137	3.34E+00	1.26E-02	4.68E+00	1.00E-06	1.90E-01	3.10E-01	8.89E-07	1.45E-06	8.89E-09	1.45E-08	98.52%
Pu 239/240	1.20E-04	4.54E-07	1.68E-04	1.00E-06	6.40E+00	1.10E+01	1.08E-09	1.85E-09	1.08E-11	1.85E-11	0.13%
Sr-89/90	1.03E+00	3.90E-03	1.44E+00	1.00E-06	8.80E-02	1.10E-02	1.27E-07	1.59E-08	1.27E-09	1.59E-10	1.08%
							1.02E-06	**1.47E-06**	1.02E-08	**1.47E-08**	
Total Max Solids and Liquids:							1.02E-03	**1.47E-03**	1.02E-05	**1.47E-05**	